## CLAIM LISTING

1. (Currently Amended)  A system for improved simulation of a biological system comprising a plurality of chemical reactions, the system comprising:

a storage; and

a processor ~~configured to~~ for:

~~construct~~ constructing a ~~composite~~ graphical model of a biological system, the graphical model of the biological system comprising at least one chemical reaction, the at least one chemical reaction represented using a wild card character that allows multiple instances of an expression to be identified using a single reaction, and a merge block having an input and an output, the output of the merge block at a time step during an execution of the graphical model being equal to a most recent input provided to the merge block,

~~including a first chemical reaction and a second chemical reaction, the composite graphical model having components described by at least two different types of mathematical models and including a specified constraint provided in addition to the first and second chemical reactions that constrains dynamic behavior of the biological system,~~

~~accept~~ accepting as input the constructed ~~composite~~ graphical model of the biological system, and

~~execute~~ executing the ~~composite~~ graphical model to generate as output dynamic behavior of the biological system ~~by~~ using the merge block and the at least one chemical reaction to produce a set of reactions described by the multiple instances of the expression. ~~a first type of computational model for the first chemical reaction, and a second type of computational model for the second chemical reaction, and the specified constraint, the executing involving evaluating the at least two different types of mathematical models, and~~

~~store the dynamic behavior of the biological system in the storage.~~

2. (Previously Presented)  The system of claim 1 wherein the graphical model is a block diagram model of the biological system.

3. (Previously presented)  The system of claim 2 wherein the processor is further configured to provide at least one block identifying a set of related chemical reactions.

4. (Previously presented)  The system of claim 1 wherein the processor is further configured to provide a graphical user interface for accepting user commands and data.

5-7. (Canceled)

8. (Previously presented)  The system of claim 1, wherein the processor is further configured to display the dynamic behavior of the biological system.

9. (Currently Amended)  ~~An improved~~ A method for simulation of a biological system ~~including a first chemical reaction and a second chemical reaction~~, the method comprising:

    constructing, using a computing device, a ~~composite~~ graphical model of the biological system, the graphical model of the biological system comprising at least one chemical reaction, the at least one chemical reaction represented using a wild card character that allows multiple instances of an expression to be identified using a single reaction, and a merge block having an input and an output, the output of the merge block at a time step during an execution of the graphical model being equal to a most recent input provided to the merge block ~~including the first chemical reaction and the second chemical reaction, the composite graphical model having components described by at least two different types of mathematical models and including a specified constraint provided in addition to the first and second chemical reactions that constrains dynamic behavior of the biological system~~;

    executing, using the computing device, the ~~composite~~ graphical model to generate dynamic behavior of the modeled biological system by using the merge block and the at least one chemical reaction to produce a set of reactions described by the multiple instances of the expression. ~~a first type of computational model for the first chemical reaction, a second type of computational model for the second chemical reaction and the specified constraint, the executing involving evaluating the at least two different types of mathematical models; and~~

    ~~storing the dynamic behavior of the modeled biological system in a storage device.~~

10. (Previously presented)  The method of claim 9 wherein constructing further comprises:

constructing a block diagram model of the biological system.

11. (Original)  The method of claim 10 wherein the block diagram model includes at least one block identifying a set of related chemical reactions.

12. (Previously presented)  The method of claim 9 wherein constructing further comprises:

accepting user commands and data; and

constructing the graphical model of the biological system using the user commands and data.

13-15. (Canceled)

16. (Currently Amended)  An article of manufacture having embodied thereon computer-readable instructions for improved simulation of a biological system comprising a plurality of chemical reactions, the article of manufacture comprising:

computer-readable instructions for constructing, using received user commands and data, a ~~composite~~ graphical model of a biological system, the graphical model of the biological system comprising at least one chemical reaction, the at least one chemical reaction represented using a wild card character that allows multiple instances of an expression to be identified using a single reaction, and a merge block having an input and an output, the output of the merge block at a time step during an execution of the graphical model being equal to a most recent input provided to the merge block, ~~including a first chemical reaction and a second chemical reaction, the composite graphical model having components described by at least two different types of mathematical models and including a specified constraint provided in addition to the first and second chemical reactions that constrains dynamic behavior of the biological system~~;

computer-readable instructions for executing the constructed composite graphical model of the biological system to generate dynamic behavior of the modeled biological system by using the merge block and the at least one chemical reaction to produce a set of reactions described by the multiple instances of the expression.  ~~a first type of computational model for the first chemical reaction, a second type of computational model for the second chemical reaction, and the specified constraint, the executing involving evaluating the at least two different types of mathematical models; and~~

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~~----------computer-readable instructions for storing the dynamic behavior of the modeled biological system in a storage.~~

17. (Previously presented)  The article of manufacture of claim 16 further comprising computer-readable instructions for displaying the dynamic behavior that is generated.

18. (Previously presented)  The article of manufacture of claim 16 wherein the computer-readable instructions for constructing a graphical model of the biological system comprises computer-readable instructions for constructing a block diagram model of the biological system.

19. (Previously presented)  The article of manufacture of claim 16 wherein the computer-readable instructions for constructing a block diagram model of the biological system includes computer-readable instructions for constructing at least one block identifying a set of related chemical reactions.

20-44. (Canceled)

45. (Currently Amended)  A system for simulation of a biological system ~~including a first chemical reaction and a second chemical reaction~~, the system comprising:

     means for constructing a ~~composite~~ graphical model of the biological system, the graphical model of the biological system comprising at least one chemical reaction, the at least one chemical reaction represented using a wild card character that allows multiple instances of an expression to be identified using a single reaction, and a merge block having an input and an output, the output of the merge block at a time step during an execution of the graphical model being equal to a most recent input provided to the merge block, ~~including a first chemical reaction and a second chemical reaction, the composite graphical model having components described by at least two different types of mathematical models and including a specified constraint provided in addition to the first and second chemical reactions that constrains dynamic behavior of the biological system~~;

     means for executing the ~~composite~~ graphical model to generate dynamic behavior of the modeled biological system by using the merge block and the at least one chemical reaction to produce a set of reactions described by the multiple instances of the expression. ~~a first type of~~

~~computational model for the first chemical reaction, a second type of computational model for~~
~~the second chemical reaction, and the specified constraint, the executing involving evaluating the~~
~~at least two different types of mathematical models; and~~
~~————— means for storing the dynamic behavior of the modeled biological system in a storage.~~


46. (Currently Amended)  A computer-readable storage medium holding computer-executable instructions for simulation of a biological system, the medium comprising one or more instructions for:

    constructing a ~~composite~~ graphical model of the biological system, the graphical model of the biological system comprising at least one chemical reaction, the at least one chemical reaction represented using a wild card character that allows multiple instances of an expression to be identified using a single reaction, and a merge block having an input and an output, the output of the merge block at a time step during an execution of the graphical model being equal to a most recent input provided to the merge block, the multiple instances of the expression representing at least a first chemical reaction and a second chemical reaction ~~having components~~ ~~described by at least two different types of mathematical models and including a first chemical~~ ~~reaction and a second chemical reaction in the biological system~~;

    calculating putative reaction times for execution of the first chemical reaction and the second chemical reaction in the graphical model;

    sorting the putative reaction times;

    executing one of the first chemical reaction and the second chemical reaction identified by a first reaction, the first chemical reaction ~~being executed using a first type of computational~~ ~~model concurrently with~~ and the second chemical reaction being executed using ~~a second type of~~ ~~computational model~~ the merge block and the at least one chemical reaction represented using a wild card character;

    recalculating the putative reaction times for the first chemical reaction and the second chemical reaction after the executing of the ~~one of the first type of computation model~~ first chemical reaction or the second ~~type of computational model~~ chemical reaction; and

    sorting the recalculated putative reaction times.~~; and~~
~~————— recalculated and sorted putative reaction times in a storage.~~


47. (Previously presented)  The medium of claim 46, further comprising:

instructions for iterating execution of the instructions for executing, the instructions for recalculating and the instructions for sorting the recalculated putative reaction times until a final simulation time has been reached to generate a dynamic behavior of the modeled biological system.

48. (Previously Presented)  The method of claim 9, further comprising:

annotating the composite graphical model in response to a user requesting to add annotations to the model that are provided by the user.

49. (New)  The system of claim 1, wherein the processor further stores the dynamic behavior of the biological system in the storage.

50. (New)  The method of claim 9, further comprising storing the dynamic behavior of the modeled biological system in a storage device.

51. (New)  The article of manufacture of claim 16, further comprising computer-readable instructions for storing the dynamic behavior of the modeled biological system in a storage.